

Bank Performance in MENA Region: A Perspective from Bank Efficiency, Risk-Taking Behaviour and Market Competition

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Abstract

The present study was aimed at investigating the influence of risk-taking behavior on profitability for IBs in MENA region for a span of time covering 2005-19. The profitability of IBs were measured by ROA, ROE and NIM while the risk-taking behavior was identified with insolvency risk, capital risk, liquidity risk and credit risk. In addition, some controlling factors like efficiency; revenue, profit and cost efficiency and development indicators; stock market development, banking sector development and banking competition along-with macro indicators like inflation rate and GDP growth rate were used. The annual stream of data was formed in panel order by accessing the same from WDI and bank scope databases. The study uses panel data estimation like fixed, random and OLS as well as the dynamic panel estimations like GMM. The Hausman specification test and LM test were not significant which validate the use of OLS for panel estimation while Arellano-Bond, Sargan and Hansen test are not significant too which validates the GMM estimates for dynamic panel. The policy makers in IBs of MENA regions are recommended to consider ROA for measuring the profitability with greater R-square value by considering risk-taking behavior indicators like capital risk, liquidity risk and credit risk. These risk factors are taking positive capacity to strongly enhance the ROA for IBs in MENA region. The future researches may consider the comparative studies based on the variable setting of the present studies with fresh evidences. The estimated results of this study are generalizable to banking sectors only.

Keywords: Risk Taking, Financial Performance, MENA, Islamic Banks

1. Introduction

Background:

Islamic banks became one of the first types of financial firms that arose in the Islamic financial industry. Because such industry is growing, and as the traditional banking system in MENA region looking to

diversify into equity markets as well as other categories, several other non-banking financial entities and resources also flourished in Islamic financial system (Ali, 2011). The banking sector of

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MENA region is diverse, even though difference with the financial sector of the developed economies is indeed very important. However, the MENA financial sector is far less flexible and comprised of medium-large entities, albeit with higher productivity, profitability and solvency (Starita, 2013). Steady growth within that financial system has become the trend in MENA zone in the late 1980s and early 1990s (Almekhlafi, Almekhlafi, Kargbo, & Hu, 2016). Financial intermediaries have to strengthen their market cap to enhance their productivity (Sufian & Kamarudin, 2014). Likewise, Islamic financial institutions need to strengthen the risk management and implement some of existing risk management tools. Therefore, the financial system also takes advantage of increased higher Islamic banks productivity and then use the untapped potential profits by expanding into those regions with restricted supply, such as the African countries (Kamarudin et al., 2017; Khasawneh, 2016). Credit risk has some serious impacts on financial institutions' results, contributing to economic and financial turmoil (Kamran, Omran, & bin Mohamed Arshad, 2019; Kamran, Omran, & Mohamed Arshad, 2018). To spotlight this important problem, the study examined bank related and macroeconomic factors of credit risk, denoted by their amount of nonperforming debts (Jabbouri & Naili, 2019).

Banking System in MENA region

Throughout the last couple of years, the Islamic financial system in the Middle east and north Africa reported a fast expansion of 10–12 percent on a yearly basis, and expanded coverage of Sharia principles enforcement by financial institutions, equity markets, and insurance agencies (Mrad & Mateev, 2020). The results suggest that financial performance decreases substantially the amount of liquidity and credit risks (Abdelaziz, Rim, & Helmi, 2020). It was anticipated that banks in MENA region have higher profits in a lesser competitive environment and different natures of risk such as insolvency, capital, liquidity and credit related risks are linked strongly to bank's profitability (Moudud-Ul-Huq, Halim, & Biswas, 2020;). Similarly, Islamic system of banking as a comparison of conventional banking are more exposed towards credit risk, more liquid, more solvent, less profitable, less stable and are more capitalized (Neifar, 2020). Banks significantly contribute to economic growth, mainly in developing nations, whereby they highlight the different mechanism for the movement of cash.

Furthermore, the performance of the banking industry has become a quality management practices in order to improve the efficacy and the stability of the banking. The internationalization of financial institutions, which has already been preceded by Govt privatization, financial innovations, the knowledge uprising and changes in technology, has changed the competitive financial sector and altered the banking sector (Hussain et al., 2020; Alaeddin et al., 2018). Owing to these innovations and improvements in the current banking market, banks are required to improve organizational performance in terms of value and benefit in order to remain competitive (Otero, Razia, Cunill, & Mulet-Forteza, 2020).

The Islamic banking (IBs) in MENA region comprises of a total number of 73 banks from nine different countries as stated Table 1.

The study aimed towards investigating the behaviour of risk-taking factors of Islamic banks in MENA region for their profitability indicators like ROA, ROE and NIM using a sample of 73 IBs operating from 2005-19 in MENA region.

Table 1. Distribution of Islamic Banks Sample in MENA region

Sr#	Countries in MENA	Islamic Banks
1	Bahrain	14
2	Egypt	6
3	Israel	0
4	Jordan	15
5	Kuwait	6
6	Morocco	5
7	Qatar	9
8	Saudi Arabia	6
9	Turkey	4
10	UAE	9
Total		73

2. Literature Review

The domain of profitability and risk-taking along with efficiency, development and macro indicators were largely studied in commercial bank setting as well as a comparison with Islamic banks around the world. The historical evidences in support of the purpose of the study is aligned below:

A research discovered that practitioners should perhaps concentrate mostly on profit performance than operational efficiencies. Banks in MENA region are significantly less cost effective than banks in European region, but comparable to financial

institutions in emerging economies. Nonetheless, banks in MENA region perform well in terms of profit performance as compared to world-wide banks (Olson & Zoubi, 2011). The Islamic system of banking uses the risk management techniques that are technically less advanced in the form of earning at risk, matching of maturity, analysis of duration, analysis of gap and credit rating. Infact, Islamic system of banking are lacking in using the techniques of risk measurements like stress testing, simulation and value at risk (Ariffin & Kassim, 2011). Some of the evidences also revealed that risk is strongly linked with inefficiency of banking system with upstream direction while the same set of variables are downstream linked in case of Islamic system of banking (Alam, 2012). Although, an inverse and strong link was observed in case of operational risk for commercial system of banking while a weak association was estimated between liquidity risk and efficiency in case of Islamic system of banking for the sample data based on MENA region banking system (Said, 2013). Similarly, the overall conclusion and findings of a research investigation revealed that majority of measures for management of credit risk are strongly boosting the level of performance in commercial banks of Rwanda region (Ugirase, 2013).

Similarly, a research based on Ethiopian banking sector documented some policy implications with the suggestions that the banking system of this region need to develop a sound system for the management of credit risk along with controlling the lending positions, overhead costs and increasing the size of loan to boost their bank's stability and financial performance (Awoke, 2014). In the same way, another research has indicated by hypotheses testing procedure that the performance of business is mainly depending upon the different factors of risk management like risk analysis, identification and assessment of credit risk (Nair, Purohit, & Choudhary, 2014). Another study related to MENA region considered the role of activities related to off-balance-sheet having strong influence for reducing the level of risk and also enhancing the level of profitability of banks. The conclusive evidences revealed that activities related to off-balance-sheet in case of regions with oil production capacity have the ability of higher level of profitability. In addition Islamic banking system in MENA region is found to be more sensitive towards risk with off-balance-sheet activities as compared to commercial system of

banking in terms of profitability (Khasawneh & Al-Khadash, 2014). A similar research investigation revealed that a strong link was established between management of credit risk towards the financial performance of bank (Luqman, 2014).

In contrast, some of the studies observed entirely different scenarios in relation to risk taking behavior and profitability with stability situations of banks. For example Almarzoqi, Naceur, and Scopelliti (2015), estimated that the liquidity of a bank is strongly boosted by competition in price due to the mechanism of self-discipline in terms of choices for the sources of bank funding. While the bank solvency and quality of its loan credit is strongly downstream due to competition in price for banking sector. In contrast, the study investigated by Lemonakis, Voulgaris, Vassakis, and Christakis (2015) revealed that a negative coefficient was estimated between risk taking behavior and efficiency of the banking system. They observed risk taking behavior by z-score of Altman's while the stability and performance was measured by stability and profitable operations of the bank. Similarly, the study as examined by Labidi and Mensi (2015) indicated that the market power in the banking sector of MENA region is low due to which this financial market is very competitive. The same is evidenced by z-score's low value in relation to instability of financial system in this region with strong coefficient.

The comparative evidences of Islamic as well as the conventional financial sector in banking system provide some interesting estimates in relation to the behavior of banks for taking the degree of risk along with their stability and performance indicators. For example, the study as examined by Mokni, Rajhi, and Rachdi (2016) discovered strong variations between the risk-taking behavior of commercial as well as the Islamic system of financial banking. The main reason behind was the inclusion of interest as income in commercial banking while profit & loss sharing in case of Islamic system of financial industry. While some of the studies found negative as well as not-significant link between the behavior of risk-taking in banking industry and their profitable operations (Haque & Shahid, 2016). In addition, some of research investigation observed risk related to insolvency and downstream performance financially (Haque & Shahid, 2016). Some of the research evidences supported to follow Basel accord for maintaining the required level of capital for mitigating and controlling

the level of risk and enhance the profitability and stability in the banking industry for both commercial along with Islamic system of banking (Bitar, Saad, & Benlemlih, 2016).

Some of the research examination reported strong variation for the influence of liquidity as well as credit risk for stable as well as instable bank position for both types of banks; commercial, Islamic, (Ghenimi, Chaibi, & Omri, 2017). While considering the banking sector for MENA region, González, Razia, Búa, and Sestayo (2017) revealed that the banking competition takes a strong capacity of reducing the financial stability while controlling the level of risk for the banking sector of this region. Another study found a great variation in determining the level of stable and profitable operations of Islamic system as well as commercial system of banking (Trad, Rachdi, Hakimi, & Guesmi, 2017). Similarly, some of the research examinations revealed new estimates for the behavior of banks in taking the level of risk and estimating the financial performances in commercial v/s Islamic banking industry (Zopounidis, Voulgaris, Christakis, & Vassakis, 2017). On the other hand, Sarmiento and Galán (2017) estimated that the affiliation and size of bank have strong role in determining the behavior of risk taking of banks for efficiency. Relatively foreign and large banks are estimated to be more efficient in the presence of market as well as credit risk. In contrast, small and domestic banks due to less capitalization are more strongly exposed towards market and credit risk. Similarly, the risk-taking behavior is more strongly influenced for oil producing region banking sector rather non-oil producing region for financial efficiency and profitability (Abdullah & Tan, 2017).

Likewise, some of the studies found inverse link of behavior for risk-taking in the financial banking industry in relation to financial performance (Majumder & Li, 2018). Similar negative coefficients were observed between risk and performance indicators in the banking industry by (Akter, Majumder, & Uddin, 2018). In contrast, some of the research evidences supported the positive link of risk-taking behavior of banking sector with their stability and financial performance in the region (Akande, Kwenda, & Ehalaiye, 2018). Some of the latest studies provided support for explaining the stability and financial performance of banking industry in MENA region by way of concentration of market (Elfeituri, 2018). The study concluded with positive and stronger link for financial performance of banking industry in this

region by the influence of adequate level of capital and market concentration. Whereas, a positive link with highly significant coefficient was estimated between the financial performance and specific risk behavior in the banking firms (Nadia, 2018). Similar evidences were supported by (González, Razia, Búa, & Sestayo, 2019; Mateev, Sahyouni, & Bachvarov, 2019; Moudud-Ul-Huq et al., 2020).

The previous studies largely explain the comparative as well as commercial banks setting for risk-taking behavior and profitability indicators. The MENA region however finds some comparative studies for IBs and CBs in the past while the fresh evidence are lacking specifically with the variable setting of the present study on Islamic banks only.

3. Methodology

The present research investigation is required to estimate the MENA region's IBs' financial performance by considering the risk-taking behavior, efficiency, institutional, sector and market development as well as the macro factors like inflation and gross domestic product.

a. Data and source

The present research investigation the set of variables and methodology as used by (Albaity, Mallek, & Noman, 2019; Fang, Lau, Lu, Tan, & Zhang, 2019). The research investigation as conducted by Fang et al. (2019) was based on the Chinese banking system while the study examined by Albaity et al. (2019) was on the banking sector of MENA region as a comparison between Islamic and commercial financial banking system. The present research however focused on the behavior of risk-taking for Islamic banking in the MENA region with an annual frequency of data from 2005 – 2019. The data was largely extracted from a popular database for this purpose named as bank-scope from Bureau van Dijk while some of the data was taken from world development indicators site for the same frequency. The data was taken from 73 Islamic banks operating in ten countries from MENA region as indicated in Table 1.

b. Measurements of variables

The present research investigation for Islamic banks of MENA region requires to investigate the financial performance in terms of risk-taking behavior of banks along with institutional, sector, market development, cost, revenue and profit efficiencies and finally the macro indicators like rate of inflation and GDP growth rate. The detailed measurements, factors, data sources and literature sources are given in table 2 as follows;

Table 2. Variable Description

Variables types & symbols	Complete Name	Indications	Literature Source	Data Sources	
Financial Performance	Dependent				
	ROA	Return on Assets	Profit after tax to total assets	(Albaity et al., 2019; Fang et al., 2019; Kusuma & Ayumardani, 2016)	Bureau van Dijk - Bank Scope
	ROE	Return on Equity	Profit after tax to total equity	(Albaity et al., 2019; Fang et al., 2019)	Bureau van Dijk - Bank Scope
	NIM	Net Interest Margin	Net non-interest income to earning assets	(Albaity et al., 2019; Fang et al., 2019)	Bureau van Dijk - Bank Scope
Risk-Taking Behavior	Bank Related (IVs)				
	INSR	Insolvency Risk	Ratio of inefficiency of stability	(Albaity et al., 2019; Fang et al., 2019; Illiashenko & Laidroo, 2020)	Bureau van Dijk - Bank Scope
	CPR	Capital Risk	Ratio of gross regulatory capital	(Albaity et al., 2019; Fang et al., 2019; Illiashenko & Laidroo, 2020)	Bureau van Dijk - Bank Scope
	LQR	Liquidity Risk	Ratio of liquid assets to total assets	(Albaity et al., 2019; Fang et al., 2019; Illiashenko & Laidroo, 2020)	Bureau van Dijk - Bank Scope
	CRR	Credit Risk	Ratio of Impaired loans to gross loans	(Illiashenko & Laidroo, 2020)	Bureau van Dijk - Bank Scope
Efficiency	RE	Revenue Efficiency	Determined by analysis of Stochastic Frontier	(Fang et al., 2019)	Bureau van Dijk - Bank Scope
	PE	Profit Efficiency	Determined by analysis of Stochastic Frontier	(Fang et al., 2019)	Bureau van Dijk - Bank Scope
	CE	Cost Efficiency	Determined by analysis of Stochastic Frontier	(Fang et al., 2019)	Bureau van Dijk - Bank Scope
Institutional, sector and Market	Industry Related (IVs)				
	SMD	Stock Market Development	Ratio of Market Capitalization to GDP	(Fang et al., 2019)	WDI
	BSD	Banking Sector Development	Ratio of Banking sector assets to GDP	(Fang et al., 2019)	WDI
	BC	Banking Competition	Boone measurement	(Fang et al., 2019)	-
Macro	Macroeconomic (IVs)				
	RGDP	GDP growth rate	GDP growth rate annual	(Fang et al., 2019; Sulaeman et al., 2019)	WDI
	INF	Inflation rate	Annual rate of Inflation	(Fang et al., 2019; Jarraya, 2014)	WDI

c. Modelling

The data required for estimating the aim of the study was arranged in panel shape. The basic econometric model for this purpose was as follows:

$$FP = \beta_0 + \beta_1(RTB) + \beta_2(EF) + \beta_3 (ISM) + \beta_4 (MAC) + \varepsilon \dots\dots\dots(i)$$

Where FP is replaced by ROA, ROE and NIM as the measures of financial performance for Islamic system of banking in MENA region. RTB is replaced by risk-taking behavior of IBs as measured by insolvency risk, capital risk, liquidity risk and credit risk. Similarly, EF is replaced by revenue, profit and cost efficiency. In addition, ISM is replaced by stock market development, banking sector development and banking competition. Finally, MAC is replaced by GDP growth rate and rate of inflation annually. The conversion of the above into panel data model give rise to the followings as follows:

$$(FP)_{it} = \alpha_0 + \alpha_1 (RTB)_{it} + \alpha_2 (EF)_{it} + \alpha_3 (ISM)_{it} + \alpha_4 (MAC)_{it} + U_{it} \dots\dots\dots(ii)$$

The panel data estimation requires the use of fixed effect as well as the random effect estimation methods after the decided upon the significance and non-significance of hausman specification tests. The fixed effect model for this purpose is as follows:

$$(FP)_{it} = (\alpha_0 + \mu_i) + \alpha_1 (RTB)_{it} + \alpha_2 (EF)_{it} + \alpha_3 (ISM)_{it} + \alpha_4 (MAC)_{it} + v_i \dots\dots\dots(iii)$$

If the fixed effect estimation technique is not validated through the hausman specification test, the model can either be estimated by random effect technique or by pooled OLS method of estimation.

The random effect model for this purpose is as follows: $(FP)_{it} = \alpha_0 + \alpha_1 (RTB)_{it} + \alpha_2 (EF)_{it} + \alpha_3 (ISM)_{it} +$

$$\alpha_4 (MAC)_{it} + (\mu_i + v_{it}) \dots\dots\dots(iv)$$

Additionally, the present research investigation as based by (Albaity et al., 2019; Fang et al., 2019, Hussain et al., 2019; Shafai' (2019); Hussain et al., 2018), is required to estimate the required set of variable through dynamic panel data estimation techniques by including the dependent variable as the first independent variable and excluding the constant term from the panel data estimation model.

The dynamic panel data model for this purpose is as follows: $(FP)_{it} = (FP)_{it-1} + \alpha_2 (RTB)_{it} + \alpha_3 (EF)_{it} + \alpha_4 (ISM)_{it} + \alpha_5 (MAC)_{it} + U_{it} \dots\dots\dots(v)$

The study targeted towards investigating the financial performance of IBs in MENA region using an annual data frequency of 2005 – 2019 (unbalance). For this purpose, the study was required to estimate descriptive statistics and regression estimates.

4. Results and Discussion

The present research analyzes the risk-taking behavior of IBs in MENA region setting along with efficiency, development and macro factors for 73 banks by considering the panel data ranging from 2005-19. The data was analyzed using descriptive statistics, graphical presentations and regression estimates of fixed, random, OLS and dynamic GMM estimates.

a. Descriptive Statistics

The present study estimated mean, standard deviation, minimum and maximum in the form descriptive statistics. The estimates are reported in table 3 as follows:

Table 3. Descriptive Statistics

Variables	Observations	Mean	Std. Dev.	Min	Max
ROA	983	1.57	1.02	-1.36	5.08
ROE	983	9.24	4.21	-6.96	28.42
NIM	983	3.89	1.67	-2.43	12.65
INSR	983	0.68	0.23	0.03	0.78
CPR	983	16.43	6.45	0.79	78.15
LQR	983	0.47	0.28	0.05	0.92
CRR	983	3.18	2.19	0.02	43.19
RE	983	0.15	0.15	-0.38	1.16
PE	983	0.38	0.24	-0.33	1.72
CE	983	1.22	1.77	0.00	11.32
SMD	983	78.07	46.14	29.22	213.56
BSD	983	4.06	0.31	1.76	5.18
BC	983	14.99	1.53	8.87	20.91
RGDP	983	3.94	5.43	-27.99	26.17
INF	983	5.44	5.22	-4.86	29.51

Table 3 above reported that the average estimation for IBs profitability in the form of ROA, ROE and NIM is indicated by 1.57, 9.24 and 3.89 respectively. The risk-taking factors like insolvency risk, capital risk, liquidity risk and credit risk indicate the average values as 0.68, 16.43, 0.47 and 3.18 respectively. Similarly, the average estimates for efficiency factors like revenue efficiency, profit

efficiency and cost efficiency reported as 0.15, 0.38 and 1.22 respectively. Likewise, stock market development, banking sector development and bank competition reports the average values as 78.07, 4.06 and 14.99 respectively. Finally, the macro factors like GDP growth rate and rate of inflation for MENA region reports the average estimates as 3.94 and 5.44 respectively.

Figure 1. Profitability of IBs in MENA

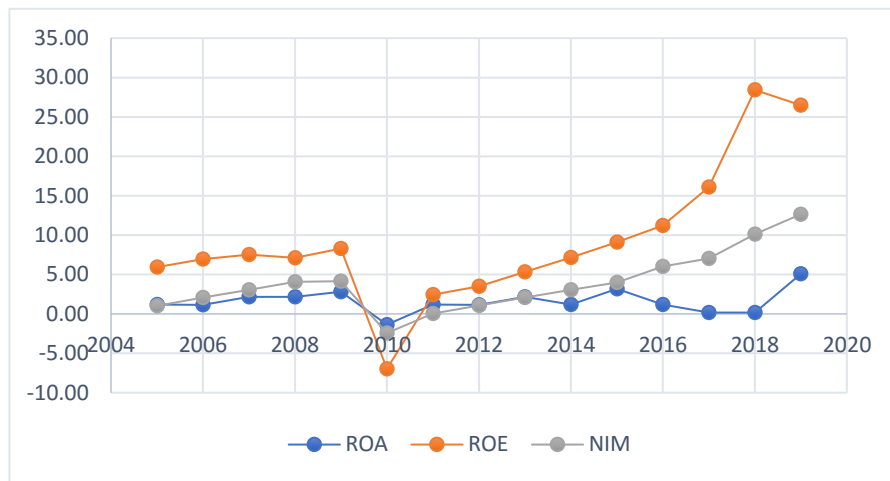


Figure 1 above indicates the increasing trend in profitability after the year 2011 whereas ROE indicates the highest level of profitability in 2018

with upstream trend for all three indicators for IBs in MENA region.

Figure 2. Risk Taking Behavior of IBs in MENA

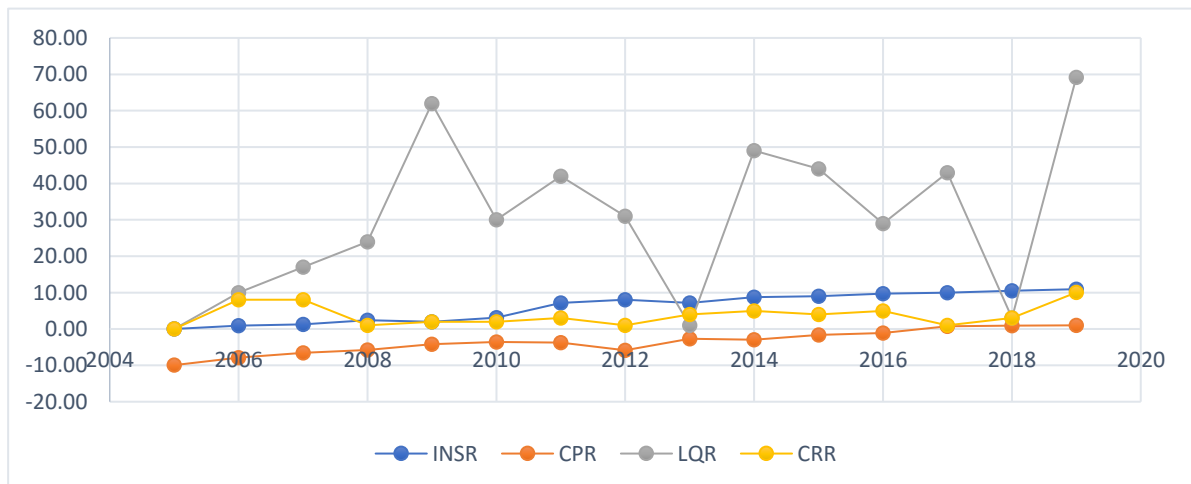


Figure 2 above indicates random trend for liquidity risk which is on highest level in the year 2019, while the same shows a consistent and moderately

upward trend for insolvency risk, capital risk and credit risk during the year 2005-19 for IBs in MENA region.

Figure 3. Efficiency

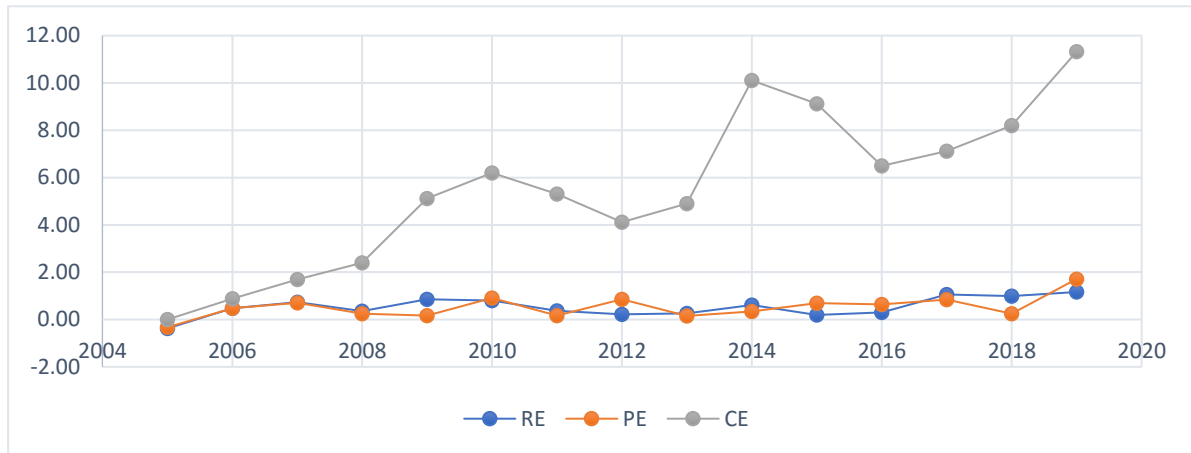


Figure 3 above indicates a rapid upstream trend for cost efficiency with highest peak in the year 2019 while the same shows moderately consistent

upstream trend for revenue and profit efficiency for IBs in MENA region.

Figure 4. Bank, Sector and Market development

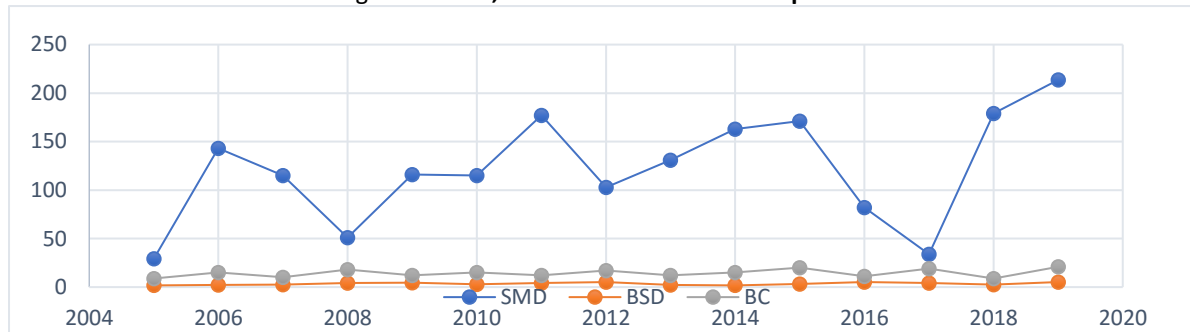
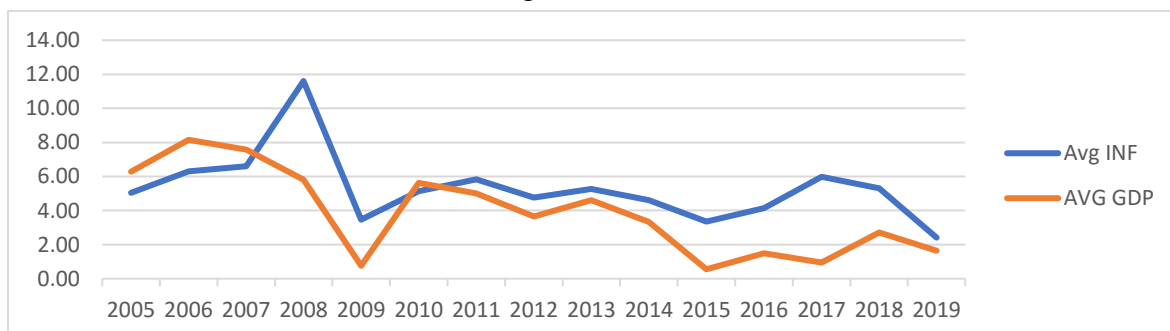


Figure 4 above indicates a random trend for stock market development which is on peak in the year 2019 while the banking sector development and

banking competition shows a consistent and moderately upward trend for IBs in MENA region.

Figure 5. Inflation and GDP



Finally, figure 5 above indicate and consistent downward trend for macro factors like inflation and GDP growth rate. The highest level of inflation for MENA region was estimated during 2008 while the lowest level of the same prevails now days. The

highest level of GDP was estimated during 2006 while the lowest level was estimated now a day.

b. Regression Estimate

The present study required to estimate the possible effect of risk-taking behavior, along with

efficiency, development and macro factors on the profitability of IBs in MENA region for the year 2005-19. A total number of 73 IBs were included in the study for which the data was obtained mainly from two sources; WDI and Bank scope databases.

The dataset was then arranged in panel format with the application of panel estimates like fixed, random and OLS with robust estimates. In addition, dynamic panel estimates like GMM was also applied. The detailed estimates are as follows:

Table 4. Regression estimates Using ROA as DV

Variables	FE	RE	OLS	Dynamic (GMM)
L.ROA	-	-	-	-0.00105 (0.0160)
Insolvency Risk	-0.0223 (0.0228)	-0.0178 (0.0208)	-0.0178 (0.0172)	-0.00905 (0.00912)
Capital Risk	-0.0222 (0.0220)	-0.0190 (0.0204)	-0.0190 (0.0177)	-0.0134* (0.00745)
Liquidity Risk	-0.00555* (0.00314)	-0.00485 (0.00312)	-0.00485 (0.00313)	-0.00499*** (0.000936)
Credit Risk	0.00793 (0.00522)	0.00956* (0.00535)	0.00956* (0.00560)	0.00532 (0.00380)
Revenue Efficiency	0.594*** (0.0834)	0.594*** (0.0833)	0.594*** (0.0825)	0.591*** (0.0141)
Profit Efficiency	0.0887*** (0.0223)	0.0821*** (0.0209)	0.0821*** (0.0211)	0.0937*** (0.00935)
Cost Efficiency	1.78e-05 (0.00179)	-0.00111 (0.00158)	-0.00111 (0.00139)	9.87e-05 (0.000765)
Stock Market Development	-0.0394*** (0.0127)	-0.0396*** (0.0125)	-0.0396*** (0.0130)	-0.0349*** (0.0120)
Banking Sector Development	-0.0182* (0.00923)	-0.0222** (0.00942)	-0.0222** (0.00950)	-0.00934 (0.00696)
Banking competition	-0.000312 (0.000899)	-0.000503 (0.00114)	-0.000503 (0.00117)	-0.000875** (0.000356)
Inflation	0.495*** (0.0438)	0.495*** (0.0338)	0.495*** (0.0528)	0.195*** (0.0411)
GDP growth rate	0.0788*** (0.0322)	0.0128*** (0.0902)	0.0128*** (0.0122)	0.0739*** (0.00539)
Constant	0.103*** (0.0230)	0.103*** (0.0215)	0.103*** (0.0197)	0.0842*** (0.0110)
Number of Observations	973	973	973	900
Number of Banks	73	73	73	73
Number of Years	15	15	15	15
R^2_W	0.6545	0.6541	-	-
R^2_B	0.6859	0.6976	-	-
R^2_O	0.6555	0.6560	0.656	-
Prob > F	0.000	-	0.0000	-
Prob > chi2	-	0.000	-	0.000
Hausman Specification Test for fixed effect	0.2843	-	-	-
LaGrang Multiplier Test for random effect	-	1.000	-	-
Number of Instruments	-	-	-	890
Arellano-Bond test P values	-	-	-	-
AR(1)	-	-	-	0.004
AR(2)	-	-	-	0.997
Sargan test of over identification P value	-	-	-	0.300
Hansen test of over identification P value	-	-	-	1.000

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 4 above reports the regression estimates in the form of fixed, random, OLS and dynamic GMM estimates using ROA as the dependent variable for the IBs in MENA region. Both the tests like Hausman specification test as well as the Lagrangian multiplier tests are not significant which validates the use of OLS for panel data modelling while the tests like Arellano-Bond, Sargan and Hansen test are not significant too which validates the GMM estimates for dynamic panel. All the models are statistically significant.

The OLS estimates in table 4 above only credit risk factor from the risk taking behavior is statistically significant with upstream coefficient. It means that the credit risk is strongly enhancing the profitability for IBs in MENA region with a coefficient value of 0.00956 with 10% level of p-value. Additionally, revenue and profit efficiencies are highly significant factors in boosting the profitability of IBs in MENA region with their coefficient's value of 0.594 and 0.0821 respectively with p-value at 1% level. Similarly, the stock market development and banking sector development are statistically takes their strong role in reducing the profitability of IBs in MENA region with their coefficient value of 0.0396 and 0.0222 and p-values as 1% and 5% respectively. Finally, the inflation and GDP growth rate as the macro indicator influence positively towards IBs profitability in MENA region with coefficient's values as 0.495, 0.0128 and p-values at 1% for each respectively. The R-square value of OLS estimates of panel data reports 66% which means that the variation in ROA is 66% explained by the variation in estimated factors of risk-taking, efficiency, development and macro indicators.

The dynamic panel estimates using GMM reports that capital risk and liquidity risk are negatively influencing the IBs profitability in MENA region with coefficient values as 0.0134, 0.00499 at 10% and 1% p-values for each respectively. Additionally, again the revenue and profit efficiencies are strongly boosting the IBs profitability with coefficient values as 0.591, 0.0937 and p-values at 1% for each respectively. Additionally, stock market development and banking competition are strongly demoting the IBs profitability in MENA region with coefficient value of 0.0349, 0.000875 and p-values as 1% and 5% respectively. Finally, the inflation and GDP growth rate are strongly boosting the level of profitability for IBs in MENA region with coefficients as 0.195, 0.0739 and p-values at 1% level

for each respectively. These results are partially consistent with (Albaity et al., 2019; Fang et al., 2019).

Table 5 above reports the regression estimates in the form of fixed, random, OLS and dynamic GMM estimates using ROE as the dependent variable for the IBs in MENA region. Both the tests like Hausman specification test as well as the Lagrangian multiplier tests are not significant which validates the use of OLS for panel data modelling while the tests like Arellano-Bond, Sargan and Hansen test are not significant too which validates the GMM estimates for dynamic panel. All the models are statistically significant.

The OLS estimates in table 5 above reports not a single factor statistically explaining the ROE as profitability of IBs in MENA region. The R-square value of OLS estimates of panel data reports 0.0086 only which means that the variation in ROE is less than 1% explained by the variation in estimated factors of risk-taking, efficiency, development and macro indicators. It infers that the ROE is not good factor for measuring the profitability for IBs in MENA region.

The dynamic panel estimates using GMM in table 5 above reports firstly that the first lag value of ROE is negatively demoting the level of profitability for IBs in MENA region with coefficient of 0.0198 and p-value as 5% level. In addition, the insolvency risk is statically demoting the level of profitability with a coefficient of 0.316 and p-value at 5% while capital risk and liquidity risk are statistically demoting the level of profitability for IBs with coefficient of 0.260 0.0270 and p-value of 5% and 1% level respectively for IBs in MENA region. Likewise, the cost efficiency is statically demoting the profitability level with a coefficient of 0.0589 and p-value as 1% level while revenue and profit efficiencies are not having a strong relation for IBs in MENA region. Additionally, the stock market development is statically enhancing the profitability while banking sector development and banking competition are strongly demoting the IBs profitability in MENA region with coefficient value of 0.512, 0.397, 0.0202 and p-values as 1%, 1% and 10% respectively. Finally, the inflation and GDP growth rate are strongly decreasing the level of profitability for IBs in MENA region with coefficients as 0.793, 0.0220 and p-values at 1% and 10% level respectively. These results are not consistent with (Abdelaziz et al., 2020; Moudud-Ul-Huq et al., 2020; Otero et al., 2020).

Table 5. Regression estimates Using ROE as DV

Variables	FE	RE	OLS	Dynamic (GMM)
L.ROE	-	-	-	-0.0198** (0.00769)
Insolvency Risk	-0.707 (0.436)	-0.291 (0.414)	-0.291 (0.397)	-0.316** (0.151)
Capital Risk	0.0558 (0.447)	0.353 (0.453)	0.353 (0.435)	0.260** (0.105)
Liquidity Risk	0.0685 (0.0603)	0.0399 (0.0525)	0.0399 (0.0533)	0.0270*** (0.0102)
Credit Risk	0.153 (0.234)	0.166 (0.204)	0.166 (0.202)	0.147*** (0.0427)
Revenue Efficiency	-0.0866 (0.470)	0.135 (0.491)	0.135 (0.465)	0.00776 (0.109)
Profit Efficiency	-0.0164 (0.237)	-0.0796 (0.260)	-0.0796 (0.257)	-0.0991 (0.0707)
Cost Efficiency	-0.0943 (0.0783)	-0.0775 (0.0597)	-0.0775 (0.0597)	-0.0589*** (0.00812)
Stock Market Development	0.553 (0.486)	0.391 (0.443)	0.391 (0.429)	0.512*** (0.126)
Banking Sector Development	-0.383 (0.251)	-0.446 (0.340)	-0.446 (0.341)	-0.397*** (0.0439)
Banking competition	-0.00521 (0.0132)	-0.00973 (0.0134)	-0.00973 (0.0131)	-0.0202* (0.0105)
Inflation	-0.833 (0.512)	-0.644 (0.403)	-0.644 (0.413)	-0.793*** (0.0934)
GDP growth rate	-0.00125 (0.0231)	-0.00379 (0.0431)	-0.00379 (0.0113)	-0.0220* (0.0501)
Constant	0.522 (0.565)	0.299 (0.545)	0.299 (0.557)	0.289*** (0.107)
Number of Observations	973	973	973	896
Number of Banks	73	73	73	73
Number of Years	15	15	15	15
R_W^2	0.0112	0.0104	-	-
R_B^2	0.0194	0.0031	-	-
R_O^2	0.0080	0.0086	0.0086	-
Prob > F	0.000	-	0.0000	-
Prob > chi2	-	0.000	-	0.000
Hausman Specification Test for fixed effect	0.6613	-	-	-
LaGrang Multiplier Test for random effect	-	1.000	-	-
Number of Instruments	-	-	-	886
Arellano-Bond test P values	-	-	-	-
AR(1)	-	-	-	0.122
AR(2)	-	-	-	0.334
Sargan test of over identification P value	-	-	-	0.839
Hansen test of over identification P value	-	-	-	1.000

Robust standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6. Regression estimates Using NIM as DV

VARIABLES	FE	RE	OLS	Dynamic (GMM)
L.NIM	-	-	-	-0.0160*** (0.00538)
Insolvency Risk	-0.0433** (0.0188)	-0.0578** (0.0237)	-0.0584** (0.0244)	-0.0540*** (0.0142)
Capital Risk	-0.0473** (0.0202)	-0.0623** (0.0254)	-0.0629** (0.0256)	-0.0654*** (0.00959)
Liquidity Risk	-0.00182 (0.00891)	-0.00110 (0.00839)	-0.00107 (0.00852)	-0.00106 (0.00145)
Credit Risk	0.00823 (0.0161)	0.00981 (0.0172)	0.00988 (0.0173)	0.0106*** (0.00255)
Revenue Efficiency	0.114 (0.0959)	0.123 (0.0929)	0.123 (0.0927)	0.119*** (0.0194)
Profit Efficiency	-0.0224 (0.0172)	-0.0425*** (0.0113)	-0.0433*** (0.0110)	-0.0498*** (0.00946)
Cost Efficiency	0.0282 (0.0276)	0.0261 (0.0263)	0.0260 (0.0264)	0.0254*** (0.00101)
Stock Market Development	-0.00233 (0.0318)	0.000105 (0.0292)	0.000182 (0.0294)	-0.00831 (0.0171)
Banking Sector Development	0.0320 (0.0278)	0.0284 (0.0209)	0.0282 (0.0195)	0.0227*** (0.00599)
Banking competition	-0.00109 (0.00148)	-0.00132 (0.00151)	-0.00133 (0.00150)	-0.00141** (0.000584)
Inflation	0.00328 (0.0611)	0.00189 (0.0271)	0.00889 (0.0371)	0.0601*** (0.00552)
GDP growth rate	0.411 (0.0599)	0.321 (0.0992)	0.321 (0.0729)	0.911*** (0.0491)
Constant	0.0496** (0.0205)	0.0725** (0.0296)	0.0734** (0.0291)	0.0843*** (0.00908)
Number of Observations	973	973	973	900
Number of Banks	73	73	73	73
Number of Years	15	15	15	15
R_W^2	0.0542	0.0535	-	-
R_B^2	0.0450	0.0606	-	-
R_O^2	0.0529	0.0537	0.054	-
Prob > F	0.000	-	0.000	-
Prob > chi2	-	0.000	-	0.000
Hausman Specification Test for fixed effect	0.5869	-	-	-
LaGrang Multiplier Test for random effect	-	0.3656	-	-
Number of Instruments	-	-	-	890
Arellano-Bond test P values	-	-	-	-
AR(1)	-	-	-	0.236
AR(2)	-	-	-	0.436
Sargan test of over identification P value	-	-	-	0.000
Hansen test of over identification P value	-	-	-	1.000

Robust standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6 above reports the regression estimates in the form of fixed, random, OLS and dynamic GMM estimates using ROE as the dependent variable for the IBs in MENA region. Both the tests like Hausman specification test as well as the Lagrangian multiplier tests are not significant which validates the use of OLS for panel data modelling while the tests like Arellano-Bond, Sargan and Hansen test are not significant too which validates the GMM estimates for dynamic panel. All the models are statistically significant.

The OLS estimates in table 6 above reports that insolvency risk and capital risk with coefficient level of 0.0584, 0.0629 and p-value of 5% is strongly demoting the profitability in terms of net interest margin for IBs in MENA region. In addition, the profit efficiency is statically demoting the level of IBs profitability in MENA region. The R-square value of OLS estimates of panel data reports 5% only which means that the variation in NIM is 5% explained by the variation in estimated factors of risk-taking, efficiency, development and macro indicators. It infers that the NIM is not good factor for measuring the profitability for IBs in MENA region.

The dynamic panel estimates using GMM in table 6 above reports firstly that the first lag value of NIM is negatively demoting the level of profitability for IBs in MENA region with coefficient of 0.0160 and p-value as 5% level. In addition, the insolvency risk and capital risk are statically demoting the level of profitability with a coefficient of 0.0540, 0.0654 and p-value as 1% for each respectively while credit risk is statistically boosting the level of profitability for IBs with coefficient of 0.0106 and p-value of 1% for IBs in MENA region.

Likewise, the revenue and cost efficiency are statically enhancing the profitability level with a coefficient of 0.119, 0.0254 with p-value as 1% level for each while profit efficiency is having a strong positive link for IBs profitability in MENA region with a coefficient value of 0.0498 and p-value of 1%. Additionally, banking sector development is statically enhancing the profitability while banking competition are strongly demoting the IBs profitability in MENA region with coefficient value of 0.0227, 0.00141 and p-values as 1% each respectively. Finally, the inflation and GDP growth rate are strongly boosting the level of profitability for IBs in MENA region with coefficients as 0.0601, 0.911 and p-values at 1% each respectively.

5. Conclusion and Recommendations

The present study opted to explain the influence of risk-taking behavior of different indicators of profitability for IBs in MENA region for a span of time covering 2005-19. The profitability of IBs were measured by ROA, ROE and NIM while the risk-taking behavior was identified with insolvency risk, capital risk, liquidity risk and credit risk. In addition, some controlling factors like efficiency; revenue, profit and cost efficiency and development indicators; stock market development, banking sector development and banking competition along-with macro indicators like inflation rate and GDP growth rate were used. The annual stream of data was formed in panel order by accessing the same from WDI and bank scope databases. The study uses panel data estimation like fixed, random and OLS as well as the dynamic panel estimations like GMM. The Hausman specification test and LM test were not significant which validate the use of OLS for panel estimation while Arellano-Bond, Sargan and Hansen test are not significant too which validates the GMM estimates for dynamic panel. The risk-taking behavior itself varies in terms of direction for influencing the IBs profitability (ROA) in MENA region. The capital and liquidity ratios takes strong part in decreasing the level of profitability while credit risk enhances the profitability for IBs in MENA region. Additionally, the efficiency factors like revenue and profit efficiencies take strong role in boosting the level of profitability for IBs in MENA region. Likewise, stock market development, banking sector development and banking competition for IBs strongly demote the profitability in MENA region. Finally, the inflation and GDP growth as the macro indicators of the study take strong role in boosting the level of profitability for IBs in this region. The ROE as the profitability indicator for IBs in MENA region is negatively influenced strongly by its past lag value. Additionally, the risk-taking behavior itself varies in terms of direction for influencing the IBs profitability in MENA region. The insolvency risk is statically demoting the profitability while capital, liquidity and credit risk takes strong part in boosting the level of profitability for IBs in MENA region. Additionally, the efficiency factors like revenue and profit efficiencies are not the strong factors of efficiency for profitability of IBs in MENA region while cost efficiency is strongly demoting the profitability for IBs in this region. Likewise, stock market development plays a statically upstream positive part in explain IBs profitability

while banking sector development and banking competition strongly demote the profitability in MENA region for IBs. Finally, the inflation and GDP growth as the macro indicators of the study take strong role in decreasing the level of profitability for IBs in this region. The NIM as the profitability indicator for IBs in MENA region is negatively influenced strongly by its past lag value. Additionally, the risk-taking behavior itself varies in terms of direction for influencing the IBs profitability in MENA region. The insolvency risk and capital risk are statically demoting the profitability while credit risk takes strong part in boosting the level of profitability for IBs in MENA region. Additionally, the efficiency factors like revenue and cost efficiencies are the strongest factors of efficiency statistically for profitability of IBs in MENA region while profit efficiency is strongly demoting the profitability for IBs in this region. Likewise, banking sector development plays a statically upstream positive part in explaining the IBs profitability while banking competition strongly demote the profitability in MENA region for IBs. Finally, the inflation and GDP growth as the macro indicators of the study take strong role in boosting the level of profitability for IBs in this region. The policy makers in IBs of MENA regions are recommended to consider ROA for measuring the profitability with greater R-square value by considering risk-taking behavior indicators like capital risk, liquidity risk and credit risk. These risk factors are taking positive capacity to strongly enhance the ROA for IBs in MENA region.

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